



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/728,193	11/30/2000	Etsuo Morita	09792909-4714	4426

7590 09/17/2003
SONNENSCHN NATH & ROSENTHAL
80th Floor-Sears Tower
233 S. Wacker Drive
Chicago, IL 60606

EXAMINER

SONG, MATTHEW J

ART UNIT	PAPER NUMBER
----------	--------------

1765

DATE MAILED: 09/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/728,193

Applicant(s)

MORITA, ETSUO

Examiner

Matthew J Song

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2, 4-20, 23 and 24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-20, 23 and 24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/9/2003 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 recites "forming a second plurality of patterns of at least one pitch, in another position in the direction of the thickness of the crystal without alignment with respect to said first plurality of patterns" in lines 8-9. The claim also requires the second plurality of patterns at least partly overlies the first plurality of patterns and at least partly does not overlie the first plurality of patterns, note lines 10-12. The deposition of patterns to meet this limitation requires a minimal amount of alignment,

Art Unit: 1765

as evidenced by the instant specification, which teaches the region where the plurality of patterns does not overlie one another to be provided without **accurate** alignment of patterns, note page 6.

4. Claims 1 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1 and 23 recite “forming a second plurality of patterns of at least one pitch, in another position in the direction of the thickness of the crystal without alignment with respect to said first plurality of patterns” in lines 8-9 of claim 1 and lines 10-11 of claim 23. Forming a second plurality of patterns without alignment with respect to said first plurality of patterns is not enabled by the instant specification. The deposition of patterns requires a minimal amount of alignment to ensure placement of a substrate in a deposition apparatus.

5. Claims 1 and 23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 1 recites, “wherein the second plurality of patterns at least partly overlies said first plurality of patterns in the direction of the thickness of the crystal and at least does not overlie said first plurality of patterns in the direction of the thickness of the crystal” in lines 10-12. Figure 1E depicts the first embodiment of invention. In Fig 1E, the last patterned material **150** on the far right appears to

Art Unit: 1765

completely overlies the first plurality of patterns and does not meet the limitation of at least partly not overlying the first plurality of patterns. The embodiment depicted in Fig 1E does not meet applicant's limitation; therefore the invention cannot be obtained as claimed.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1 and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1 recites "forming a second plurality of patterns of at least one pitch, in another position in the direction of the thickness of the crystal without alignment with respect to said first plurality of patterns" in lines 8-9. It is unclear what "without alignment" is referring to because without alignment is not defined. The second plurality of patterns in Fig 1E and Fig 1F clearly appear to be aligned with respect to the first plurality of patterns.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1,2, 4, 7, 11-20 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pribat et al (US 4,952,526).

Pribat et al discloses a wafer 1 made of GaAs or InP (claim 14), this reads on applicant's basal body, depositing a dielectric thin layer 2 of silicon nitride or silica (claim 12-13), where excellent deposition selectivity can be obtained between GaAs and a silicon nitride film by plasma assisted CVD (claim 16-17) (col 10, ln 1-35) with a thickness between 5×10^{-2} and a few micrometers, etching a set of bands 23,24 (claim 2 and 7) on the dielectric using means known to those skilled in the art such as photolithography or wet or dry chemical attack (col 4, ln 50-60), where the bands 23,24 have a width of 0.5 to a few microns and being spaced out at distances of some microns to several hundred microns, thus periodically baring the substrate (col 10, ln 50-67 and col 11, ln 1-10 and Figs 23-24). Pribat et al also discloses a deposition of a thin film of III-V compound is deposited on the preceding structure by MOCVD, with a thickness of a few hundred angstroms to a few microns and depositing a second layer of dielectric, with a thickness of a few hundred angstroms to a few micrometers (col 11, ln 11-38 and Fig 26). Pribat et al also discloses apertures are etched in a second layer of the dielectric and the apertures are offset with respect to the previous ones and the offset can vary from some micrometers to some hundreds of micrometers, this reads on applicant's forming patterns at least partly overlies one another and at least partly do not overlies one another. Pribat et al also discloses III-V polycrystalline material is removed by chemical attack through the apertures, this reads on applicant's forming an indentation (claim 16-19) so as to bare the monocrystalline seed through the apertures and growing a thin layer of monocrystalline III-V material between the dielectric layers and the upper dielectric is removed throughout the surface of the wafer so as to obtain a monocrystalline thin layer of semiconductor (claim 17) (col 11, ln 39-67 and Fig 27). Pribat et al also discloses repeating the disclosed method to obtain a stacking shown in Fig 14 (claims 16-19) (col 12, ln 1-

Art Unit: 1765

25 and Figs 22-31). Pribat et al discloses a base layer **32** in Fig 31 (claims 11 and 16-19). Pribat et al also discloses a first pattern of dielectric material **50** and **51** with different lengths than a second pattern of dielectric material **20** and **21** in Fig 19.

Pribat et al does not teach the pitch of pattern elements of one of the plurality of patterns and pitch of pattern elements of another of the plurality of patterns are different from each other.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Pribat et al to obtain a different pitch between pattern elements of one and another pattern element by optimizing the pitch of each pattern element by conducting routine experiments of a result effective variable as recognized by the art.

Pribat is silent to the limitation of without alignment with respect to the first plurality of patterns. However, without alignment is unclear, as discussed previously, therefore because Pribat teaches a second plurality of patterns partly overlies the first plurality of patterns and at least partly does not overlie the second plurality of patterns, as applicant, and Pribat does not explicitly teach alignment or without alignment, Pribat reads on applicant's without alignment.

Referring to claim 4, Pribat et al teaches optimizing the pitch of each pattern element, this inherently would satisfy the relationship of claim 4.

10. Claims 1, 4-6 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pribat et al (US 4,952,526) in view of Fleming et al (US 6,358,854).

Pribat et al teaches all of the limitations of claim 1, as discussed previously above, except the pitch of pattern elements of one of the plurality of patterns and pitch of pattern elements of another of the plurality of patterns are different from each other.

In a method of layered material compositions, Fleming et al teaches a first structured layer 204 comprises a planar pattern of spacer bars 202 of a first material, silica, and rods 205, of a second material, polysilicon, (col 7, ln 1-67) and the first and second material can be selected from III-V semiconductors (col 8, ln 60-67 and col 9, ln 1-20) and features which make a structured layer need not be rectangular bars arranged parallel to each other, but can take on nearly any shape, size (claim 6) and orientation and the size, spacing and separation of elements, this reads on applicant's pitch, making up the structured layers can also vary between layers (col 10, ln 1-30 and col 11, ln 1-10). Fleming et al also discloses a first layer includes a continuous hexagonal distribution of first material, this reads on applicant's two directions (claim 8), the voids of the array being filled with a second material (col 11, ln 11-30 and Fig 6) and a conventional two-dimensional photonic lattice is implemented with a single structural layer (claim 8), the two-dimensional structure within that layer giving the desired optical properties. (col 12, ln 1-35). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Pribat et al with Fleming's varying pitch between layers to change the optical properties.

Response to Arguments

11. Applicant's arguments with respect to claims 1,2, 4-20 and 23-24 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Art Unit: 1765

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 703-305-2667. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
Art Unit 1765

MJS

NADINE G. NORTON
PRIMARY EXAMINER

